

RTCA Special Committee 186, Working Group 3

ADS-B 1090 MHz MOPS

WG-3 Meeting #30

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Proposed Text for Source Selection
In Response to Action Item 29-01

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Summary
This Working Paper addresses proposed text for source selection. It was originally proposed to WG-3 for inclusion in DO-260B after their review of the proposed issues related to preserving paragraphs out of the STP MOPS, related to Action Item 25-07 accepted by Larry Bachman. This version includes proposed requirement and test paragraphs.

Proposed Text for Source Selection:

Insert the following text in DO-260B in a new section 2.2.5.3 as follows:

2.2.5.3 ADS-B Transmission Device Source Selection

When more than one position source is provided to the ADS-B transmitter, the transmitter **shall** select a single source to provide horizontal position, horizontal velocity, and their associated quality metrics. Heading on the surface is an exception to this requirement.

Notes:

- 1. The source selection logic should be designed to prevent the selection from alternating between valid sources. One acceptable way to ensure this is to allow the source selection to switch sources only after an alternate source has consistently exceeded the performance of the currently selected source for several seconds.*
- 2. Source selection logic may include criteria specific to the sources available on the aircraft. When selecting among sources with equal Source Integrity Level (SIL) values, the source with the smallest Radius of Containment should be selected. It is anticipated that regulatory guidance will be provided to govern source selection among sources with different non-zero SIL values.*

Insert the following text in DO-260B in a new section 2.4.5.3 as follows:

2.4.5.3 Verification of ADS-B Transmission Device Source Selection (2.2.5.3)

Purpose/Introduction:

This test procedure verifies that the source selection logic chooses the best source based on the quality of the available integrity. It also verifies that all horizontal position, velocity, and quality metrics are used from a single selected source. Section 2.4.3.2.3.1 tests that all possible quality metrics can be encoded so that is not repeated here. This procedure is written assuming that two position sources are available to the ADS-B transmitter. If more than two sources are available in an installation, this test should be expanded to encompass the available sources.

Measurement Procedure:

Step 1: Select Source with Smallest Radius of Containment, Airborne

Configure the ADS-B Transmitter as In-Air.

Provide position information on Interface A with: Latitude = 35.0 North, Longitude = 90.0 West, N/S Velocity = 100 Knots North, E/W Velocity = 100 Knots East, Horizontal Accuracy = 35 meters, Horizontal Integrity = 80 meters, SIL=3.

Provide position information on Interface B with: Latitude = 23.0 South, Longitude = 70.0 East, N/S Velocity = 50 Knots South, E/W Velocity = 50 Knots West, Horizontal Accuracy = 20 meters, Horizontal Integrity = 190 meters, SIL=3.

Verify that the transmitted Airborne Position Message, Airborne Velocity Message, and Operational Status Message fields are populated with data from Interface A. Specifically the decoded Latitude = 35.0 North, the decoded Longitude = 90.0 West, N/S Velocity = 100 Knots North, E/W Velocity = 100 Knots East, NACp = 8, Airborne Position Type Code = 11, NIC Supplement A = 0, and SIL=3.

Step 2: Switch Sources when Integrity of the Alternate Source is Consistently Better, Airborne

Change the Horizontal Integrity on Interface B to 60 meters. Wait for the source selection logic to re-evaluate the selection criteria.

Verify that the transmitted Airborne Position Message, Airborne Velocity Message, and Operational Status Message fields are populated with data from Interface B. Specifically the decoded Latitude = 23.0 South, the decoded Longitude = 70.0 East, N/S Velocity = 50 Knots South, E/W Velocity = 50 Knots West, NACp = 9, Airborne Position Type Code = 11, NIC Supplement A = 1, and SIL=3.

Step 3: Select Source with Smallest Radius of Containment, Surface

Configure the ADS-B Transmitter as On-Ground.

Provide position information as in Step 1. If heading is available to the system, invalidate it so the system reverts to using Track Angle.

Verify that the transmitted Surface Position Message and Operational Status Message fields are populated with data from Interface A. Specifically, the decoded Latitude = 35.0 North, the decoded Longitude = 90.0 West, Ground Track = 45 Degrees, NACp = 8, Surface Position Type Code = 7, NIC Supplement A = 0, and SIL=3.

Step 4: Switch Sources when Integrity of the Alternate Source is Consistently Better, Surface

Change the Horizontal Integrity on Interface B to 60 meters. Wait for the source selection logic to re-evaluate the selection criteria.

Verify that the transmitted Surface Position Message and Operational Status Message fields are populated with data from Interface B. Specifically the decoded Latitude = 23.0 South, the decoded Longitude = 70.0 East, Ground Track = 225 Degrees, NACp = 9, Surface Position Type Code = 11, NIC Supplement A = 1, and SIL=3.